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ABSTRACT

The population Curriculum Study of the University of Delaware proposes a school program to develop a comprehensive knowledge and understanding of man in his environment. The central theme of the Pcpulation Curriculum Study is: MAN IS PART OF A NATURAL SYSTEM, AND IS ULTIMATELY SUBJECT TO THE LIMITS OF THE SYSTEM. We are thinking of population education not merely as training to bring about a decline in the population growth rate but rather as the central theme of the entire educational enterprise, encompassing the needs and behavior of man, his population and his environment, and the interactions of these forces. Using this definition, many aspects of population education can already be identified in existing school programs. Existing curricula have a good deal of content that is related both directly and indirectly to population-environment studies, which can be used without disruption of existing programs. To prepare a population-environment education program under these circumstances the first need is a conceptual scheme outlining the concepts needed to understand population-environment problems. The program built on this conceptual scheme should be K-12, multidisciplinary, and problem-solving in approach. Obviously, we cannot solve cur population problems in the schools, but the schools can help students to attain concepts of the natural systems, for democratic decisions. (Author/SLD)

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CHARACTERISTICS OF A MODEL K-12 POPULATION EDUCATION PROGRAM

A PAPER PRESENTED to the College and University meetings of the National Council for the Social Studies, November 24, New York

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I am assuming that population education includes environment education, since a population must naturally exist in an environment. Population education also includes demography, family planning, and sex education. It is probable that demography would be accepted as part of population education in all definitions, but there would be differences about the advisability of including sex education.

I am also assuming that there is a need for population education, that voluntary controls of population growth and life styles is possible and that schooling can be effective in this area.

The Population Curriculum Study of the University of Delaware proposes a school program to develop a comprehensive knowledge and understanding of man in his environment. The central theme of the Population Curriculum Study is:

MAN IS PART OF A NATURAL SYSTEM, THE EARTH, AND
IS ULTIMATELY SUBJECT TO THE LIMITS OF THE SYSTEM.

We are thinking of population education not merely as training to bring about a decline in the population growth rate but rather as the central theme of the entire educational enterprise, encompassing the needs and behavior of man, his population and his environment, and the interactions of these forces.

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Using this definition, many aspects of population education can already be identified in existing school programs.

In science education there is a tendency to follow the emphasis of the scientific establishment. Today biology is dominated by cellular and molecular studies and tenth grade biology reflects this emphasis. Even seventh grade biology courses show this influence. There is now, however, a swing toward ecology, and no doubt there will soon be an over-emphasis of that subject.

In the BSCS Blue Version text for tenth grade biology, Unit 8 is devoted to Higher Levels of Organization, with chapters on the evolution of man, population, societies, and communities. This unit is at the end of the book starting on page 655. The last chapter is entitled The Ecosystems. There are about 650 words under the heading What is Man's Place in the Communities of Nature? The last paragraph in the book says, "In your lifetime many critical decisions on water and air pollution, and human population growth, will have to be made. Man is running out of time. His survival will ultimately depend on how wisely he uses his natural resources." It seems an afterthought.

This is not a denunciation of the Blue Version, which is in many ways an admirable textbook, widely used and respected. It simply indicates a lack of emphasis of population studies in a prominent tenth grade biology text, which is sponsored by the American Institute of Biological Sciences and planned and written by leaders in biology and biology education under the direction of the Biological Sciences Curriculum Study.

I know what some of you are thinking. Of course! It's the biologists who are making a mess of things. But the situation is no better in social studies education.

In spite of these shortcomings, existing curricula have a good deal of content that is related both directly and indirectly to population-environment studies, and the existing school program can be used to introduce population-environment studies into the schools without disruption.

To prepare a population-environment education program under these circumstances the first need is a conceptual scheme outlining the concepts needed to understand population-environment problems. The program built on this conceptual scheme should be K-12, multidisciplinary, and problem-solving in approach.

WHY K-12?

The problems that arise from the interaction of the human population and its environment often have their foundations in childhood experiences. Attitudes toward the environment, community responsibility, and family size seem to develop early in life.

It is also quite clear that small children have an almost universal interest in their environment. If they haven't been taught otherwise, they enjoy studies of animals and plants, rocks and minerals, water, air, machines, and people. They particularly appreciate the out-of-doors and the things to be found there.

The often troublesome task of teaching about sex and reproduction can begin very early in studies of the life cycles of flowering plants, and of butterflies. The child that rears his own butterfly from egg to adult begins to appreciate the basic elements of life. And when primary school children intently and innocently observe the copulation of the adult butterflies and the laying of the new crop of eggs, it would seem that progress is being made in the development of a realistic concept of

sex and reproduction. If the teacher happened to be oriented to the population education approach, the relationship between the food supply and the ravenous population of caterpillars could be shown. This could be turned, quite naturally, to the consideration of food crops and people, insect pests and pesticides. And so the concept of the natural system would emerge, gradually through the years, increasing in sophistication. There's no magic formula--we need only an expanded conceptual scheme and informed and professional teachers. The kids are ready, willing and able.

WHY A MULTIDISCIPLINARY APPROACH?

Attempts to study population problems within the confines of a single separate subject area face all the dangers of oversimplification. Conclusions drawn from a single subject approach tend to be both superficial and misleading.

The term "multidisciplinary", used here, refers to the study of population-environment problems using the concepts and inquiry methods of both the social and natural sciences.

A study of food production properly falls in the domain of agricultural science and technology but other disciplines are involved. Price support programs, federal and state regulations, taxes, marketing, and production are within the realms of political science and economics. Plant and animal chemistry and human dietary needs are matters of concern in the fields of physiology and biology. The impact of man's value systems, social organization, and cultural heritage suggest roles for sociology and anthropology.

A multidisciplinary approach does not make curriculum work in population-environment studies easier. A single course approach would

often be more convenient for the curriculum builder. It could be direct, and neatly organized. But studies of man and his habitat do not fall naturally within the limits of a single discipline.

The success of multidisciplinary studies in population education will depend upon a firmly established conceptual scheme. Students and teachers cannot become scholars in each of the contributing fields. But each, in terms of his own abilities and competencies, can develop contributing specializations within the conceptual scheme. With open communication and cooperation among the disciplines, varied perspectives and interpretations can become part of each student's educative experience.

It is not suggested that organized programs, following conventional subject matter lines in the schools, should be replaced. Under the influence of a conceptual scheme for population education, the existing courses can be reoriented, sometimes only slightly, in other cases substantially. Teachers and students will use the context of each subject area to study appropriate aspects of the conceptual scheme. And, finally, there exists the possibility that a stronger articulation and direction for the total school program will come from interdisciplinary responsibilities.

WHY USE THE EXISTING SYSTEM?

The existing school system is, at least potentially, able to absorb a population education program. Much of what is now done in the schools can be turned to account in population education by a simple reorientation or substitution.

In biology, studies of genetics and evolution should focus on man, and considerations of the food pyramid should include man and agriculture, as well as the organisms of a pond. The same principles of

ecology can be studied in human communities as in untouched virgin forests. The studies are more frustrating, to be sure, but these perplexing ecosystems in which man is involved are the ones we must understand. We must add that troublesome dimension, MAN, to all our studies, even if clear and satisfying results may thereby escape us.

If we attempt to put population education into neat, new packages to be added to the existing curriculum, we will not succeed because: (1) the school program is already jammed with requirements and a new course in population studies will be taken by only a few; (2) we will lose the multidisciplinary effect since the teacher will tend to favor his predominant academic background; (3) the program will attract unwarranted and unnecessary attention; (4) teachers will tend to resent the intrusion of "non-specialists" into their domain; (5) and there will be confusion and waste of time because many school courses of study already include some studies of population, and we must take advantage of that resource.

The "infusion" plan, proposed here, will tend to eliminate the need for special textbooks for population studies. There will be a need for some supplementary material such as teachers' sourcebooks and selected reading, but the economy of the plan will be attractive to school administrators.

Evaluation will be somewhat of a problem because the content of population education will be widely distributed in the school program. Probably, evaluation of the concept attainment and attitude changes in students should be appraised at the end of each grade level.

Another problem with the "infusion" plan will be those students who leave school before receiving the full impact of the K-12 program. In this case, provisions for "catch-up" studies could be

planned. It may be desirable to offer a 12th grade course in population-environment studies for a few years after the program is started to make up experiences the students missed before the start of the program. Or it may be necessary to accelerate certain parts of the program as students reach an age of need, such as a need for knowledge of family planning.

Another favorable feature of using the existing school program for the infusion of population studies is that by this method population studies can be absorbed unobtrusively by almost any science and social studies curriculum. In no case will there be a need for conspicuous or troublesome changes in the existing courses of study.

In spite of certain difficulties at first, it will be the steady effect of an "infusion" program, year by year, that will eventually produce an electorate aware of population-environment problems and equipped to make the necessary choices of personal life style and social action.

WHY A PROBLEM-SOLVING APPROACH?

The problems generated by the interaction of human populations on their environments are numerous, diverse, controversial, and constantly changing. Solutions to specific problems will rise out of knowledge and understanding of the natural system coupled with the willingness and ability to solve problems.

Too often teachers tend to be mere dispensers of information. This is recognized in the writing of the newer curricula, which tend to encourage inquiry learning by discovery, problem-solving, and the processes of science. The idea is to involve students in the practice of the mental processes by which new knowledge is gained and by which problems are solved. The AAAS Processes of Science program for kindergarten through sixth grade is organized for the attainment of skills

in such processes as hypothesizing, inferring, observing, predicting, classifying, and formulating models. When the processes are used as a means of attaining certain knowledge and understanding, the student gains both meaningful concepts and process skills. In some cases, however, it appears that the process skills become the principal objective and the concepts are given only secondary attention. This is faulty and unnecessary because any concepts that might be selected as primary goals, would have to be attained through the use of the processes. There is no need to neglect the concepts in order to focus on the process skills. In fact, the attainment of process skills will be greatly enhanced by the emergence, from the inquiry process, of clearly discernible concepts. For population-environment education, the conceptual scheme must be formulated first, then the situations devised for the attainment of process skills.

If we are concerned that students gain a concept of the forces at work in the growth and development of a human community, we might want to confront them with a situation from a local newspaper. Suppose there is a controversy about the proposal of the county planning board, with the encouragement and financial backing of a local industrial firm, to build a dam which will provide water for the future population growth and industrial expansion. Local groups oppose the plan because it will obliterate one of the last "natural" areas in the county and will encourage growth and development. They say that the plan is no plan at all but merely an accommodation for growth predictions based on past experience. There is no doubt that the density of the population will increase, especially if the dam provides more water. But the conservation groups are asking for other choices, in addition to that of inevitable growth and

development. They say there are too many people in the county now and that additional growth is unnecessary and undesirable.

Such a situation, real or devised, can be a stimulating and challenging opportunity for students to attain concepts through investigations that involve biology, engineering, geology, economics, politics, and human relations. There is no limit to confrontations of this sort in the subject matter of population-environment education.

Obviously, we cannot <u>solve</u> our population problems in the schools. The problems are too complex, too changeable, often too controversial. But the schools <u>can</u> help students to attain concepts of the natural system and problem-solving skills, through practice, that will be the basis for democratic decision-making throughout their lives.

Very briefly let me show the preliminary form of a conceptual scheme devised by the Population Curriculum Study.

Our theme is:

> Man is a part of a natural system,
> the Earth, and is ultimately subject
> to the limits of the system.

The conceptual scheme is outlined below:

I. The Earth is a finite natural system.

   A. The properties and interactions of water, air, and the physical earth set the limits of the natural system.

   B. All living things have arisen from and are dependent upon the natural system of the earth.

   C. Man originated from and is subject to the limits of the natural system.

II. The Evolution of the primates resulted in a capacity for culture.

   A. The interaction of primate structural features with the environment contributed to the evolution of a large brain.

B. Increased intelligence enabled early man to understand the advantages of cooperation.

C. The evolution of speech and language promoted the development of culture.

III. The natural system influences the evolution of human culture.

A. Stable human communities tended to form in river regions with plentiful water, temperate climate, and fertile soils.

B. The availability and utilization of resources contributed to the differentiation of life styles.

IV. Cultural evolution led to dominance of the environment.

A. Technological developments have led to accelerated population growth through death control.

B. Cultural factors are involved in the growth and distribution of human populations.

C. The growth of science and technology increased man's use of natural resources.

V. The activities of human populations may lead to conditions restricting the quality of life.

A. Human activities may lead to poverty and hunger and restrict human fulfillment.

B. Human activities cause pollution.

C. Human activities may deplete natural resources.

D. Human activities may degrade the esthetic quality of the environment.

E. Population pressure may affect human behavior.

VI. By planning within the natural system, a life of acceptable quality can be provided for all people.

A. Individual values and life styles can be compatible with a permanently hospitable and beautiful planet.

B. Social and technological programs can improve the use of resources, prevent environmental degradation and protect human rights.

This conceptual scheme will be expanded with subconcepts for three grade levels, primary, middle, and upper schools.

Teacher responsibility will be schoolwide.

We believe that this approach will work.